QK1
.J79
vol. 5
pt. 6

Hokkaido

東北帝國大學農科大學紀要

第五卷　第六號

THE

JOURNAL

OF THE

COLLEGE OF AGRICULTURE,

TOHOKU IMPERIAL UNIVERSITY,

SAPPORO, JAPAN.

VOL. V, PART VI.

東北帝國大學農科大學印行

大正二年八月

SAPPORO.

AUGUST, 1913.

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ERRATA.

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155	17	"	pterastigma	"	pterostigma

Japanese Dragonflies of the Family Calopterygidae with the Descriptions of Three New Species and One New Subspecies.

By

Kan Oguma.

This paper is based chiefly upon the study of the specimens preserved in the entomological laboratory of the college and partly also of my own collection as well as of those sent by my friends from different parts of Japan. The species recorded as indigenous to Japan by previous authors are eleven in number, but my present study shows, that six more species occur in our country. Of these 17 species five are found in Japan proper—from Hokkaido to Kiushiu; while the rest are exclusively confined to subtropical parts of Japan — Loo-Choo, Formosa and Bonin Islands. For the sake of convenience, they will be called respectively palaearctic and subtropical species in the descriptions of this paper. They are as follows:–

I. Palaearctic species.

1. *Calopteryx virgo* LINNEUS. ..... Japan, Europe.
2. *C. cornelia* SELYS. ..... Japan.
3. *C. atrata* SELYS. ..... Japan.
4. *Mnais strigata* HAGEN. ..... Japan.
5. *Palaeophlebia suprestes* SELYS. ..... Japan.

II. Subtropical species.

6. *Matrona nigripectus* SELYS. ..... Formosa, China.
7. *M. basilaris* SELYS. ..... Loo-Choo, China.
8. *Psolodesmus mandarinus* MCLACHLAN. ..... Formosa, China.

9. *P.* *dorothea* WILLIAMSON. .... Loo-Choo, Formosa.
10. *Mnais tenuis* OGUMA. ....Formesa.
11. *Mevrobasis chinensis* LINNNUS. ... .Loc-Choo?, China, E. India.
12. *Euphaea formosa* HAGEN. .... Foemosa.
13. *E.* *yayeyamana* MATSUMURA. ... . Loo-Choo.
14. *Bayadera hyalina* SELYS. .... Formosa.
15. *Rhynocypha 14-maculata* OGUMA. ....Bonin Islands.
16. *R.* *ogasawarensis* MATSUMURA. .....Formosa, E. India.
17. *Micromerus lineatus* BURMEISTER.

All of the palaearctic species exhibit wide ranges of distribution in Japan proper, except the first which has not yet been found in Hokkaido, most of them being noted for their beneficial influence on the rice culture as they devour the injurious insects of the rice plants. Of the subtropical species *Rhynocypha ogasawarensis* occurs in the Bonin Islands only, and the rest are found in Loo-Choo and in Formosa.

The islands of Loo-Choo are of importance as regards the distribution of dragonflies, as in the case of other insects, inasmuch as they form the connecting link or stepping stones between Formosa and Japan proper. In Loo-Choo are found many species of this family which are also found in Formosa, but it is noteworthy that there is no species common both to these islands and to Japan proper.

The Formosa Strait on the other hand seems to form no barrier in the distribution of Calopterygidae, since the species are most frequently met with in Formosa are also found upon the Asiatic continent. The channel called Bashi Channel which sparates Formosa from Philippines however acts quite contrary, as far as this family is concerned; one is not able to find even a single species common to both islands.

Though tiny in area, the Bonin Islands widely scattered in the Pacific Ocean are also famous in consequence of their peculiar fauna, since PRYER collected the pretty butterfly, *Lycaena ogasawaraensis* during his stay in Japan. I have two of the most peculiar species of dragonflies from those islands, one of them belonging to the family Calopterygidae. The demarkation line which separates Loo-Choo from Kiushiu should be extended estward and

must include the Bonin Islands in the region to which Loo-Choo and Formosa belong.

The Kurile Islands and Saghalin can be disregarded in considering the distribution of Calopterygidae, since no single specimen has been obtained from those regions.

I wish to express my sincerest thanks to Prof. Dr. M. MATSUMURA for his constant aid and kind advices during my study on odonatology. My obligations are also due to Messers UCHIDA, FUKUDA, YANO and KOMURA for their kindness in putting their collections at my disposal.

Key to the Japanese Calopterygidae.

A Wings longer than abdomen, frons projected forming a large tubercle.
  B M_{1-3} and M_4 arising from a single point on the Ar. ... *Micromerus.*
  BB M_{1-3} and M_4 widely apart in the start ... ... *Rhymocypha.*
AA Wings shorter than abdomen, frons not projected.
  B Body stout, with the coloration of a *Gomphus.* ... ... *Palaeophlebia.*
  BB Body slender like an Agrionid.
    C Subquadrangle slightly bent at the arculus, M_{1-4} arising from the middle or upper part of the latter.
      D Quadrangle and basal radial space crossed.... ... ... *Euphaea.*
      DD Quadrangle and basal radial space free from cross nervures *Bayadera*
    CC Subquadrangle nearly straight, M_{1-3} and M_4 arising from the lower part of the arculus.
      D True pterostigma present.
        E Quadrangle with 10 or more cross nervures ... ... *Psolodesmus.*
        EE Quadrangle with only 4 or 5 cross nervures ... ... *Mnais.*
      DD True pterostigma obsent.
        E M_2 and M_3 bifurcated ... ... *Nevrobasis.*
        EE M_2 and M_3 simple.
          F Basal space reticulated .. .. *Matrona.*
          FF Basal space free from cross nervuress ... ... *Calopteryx.*

Order ODONATA.

Suborder ZYGOPTERA.

Family CALOPTERYGIDAE.

Genus Calopteryx LEACH.

1. Calopteryx virgo LINNEUS.

Libellula virgo Linn., Syst. Nat. 1. p. 545 (1758).

Colopteryx japonica SELYS, Sonop. Calop. add. II. p. 3 (1869).

Calopteryx virgo race japonica SELYS, Ann. Soc. Ent. Belg. XXVII. p. 128 (1883).

Nom. Jap. *Aoba-tombo.*

Loc. Honshiu, Shikoku?, Kiushiu.

2. Calopteryx cornelia SELYS.

Calopteryx cornelia SELYS, Synop. Calop. add. II. p. 4 (1867).

Nom. Jap. *Miyama-kawa-tombo.*

Loc. Hokkaido, Honshiu, Shikoku?, Kiushiu.

3. Calopteryx atrata SELYS.

Calopteryx atrata SELYS, Synop. Calop. p. 16 (1853).

Nom. Jap. *Haguro-tombo.*

Loc. Hokkaido, Honshiu, Shikoku?, Kiushiu.

Genus Matrona SELYS.

4. Matrona nigripectus SELYS.

Matrona nigripectus SELYS, Synop. Calop. add. IV (1879).

Nom. Jap. *Taiwan-haguro-tombo.*

Loc. Formosa.

5. Matrona basilaris SELYS.

Matrona basilaris SELYS, Synop. Calop. p. 17 (1853).

" " SELYS, Odon. Loo-Choo, p. 5 (1888).

Nom. Jap. *Riukiu-haguro-tombo.*

Loc. Loo-Choo.

As has previously menthoned by SELYS[1], the form from Loo-Choo shows quite a different appearance compared with the typical form. It differs from the latter by its smaller size, and also by its thorax never having yellow parts but beeing greenish black and having no streaks on the lateral sutures.

Not a single specimen assuming the typical feature of *basilaris* has been collected from Loo-Choo.

Genus Psolodesmus MCLACHLAN.

6. Psolodesmus mandarinus MCLANCHLAN.

Psolodesmus mandarinus MCLANCHLAN, Trans. Ent. Soc. Lond. II. p. 167 (1870).

Nom. Jap. *Shiroobi-kawa-tombo.*

Loc. Formosa.

The type specimen was first collected in Amoy, and afterwards HAGEN showed that the same species occurs also in Formosa. There are three specimens in the collection of the entomological laboratory of the college, but unfortunately it is quite unknown to whom their collection is due.

7. Psolodesmus dorothea WILLIAMSON.

Psolodesmus drothea WILLIAMSON, Ent. New. XV. pp. 247-250 (1904).

Nom. Jap. *Kinuba-kawa-tombo.*

Loc. Formosa (LOOMIS, MATSUMURA).

7a. Psolodesmus dorothea kuroiwae MATSUMURA. subsp. nov.

Length of the abdomen	♂ 44mm.	♀ 42mm.
Length of the hind wing	♂ 37-40mm.	♀ 32mm.
Length of the pterostigma	♂ 2.5mm.	♀ 1.5mm.

1) Odon. Loo-Choo, p. 5.

This subspecies is easily distinguishable from the type in the following points.

1. Size much smaller.

2. Head, thorax and 1–2 segments of the abdomen dull bronz, while metallic green in the type.

3. In the male, wings without pearly reflection, not smoked along the costa and the apical opaque area highly reduced, only the small part beyond pterostigma brownish. In the female, wings faintly smoked and the apical opaque area being much smaller.

The lack of iridescent nature in the wings of males is the most important peculiarity to separate this subspecies from the type. It might sometimes be taken as a distinct species whenever the details are not sufficiently studied.

Nom. Jap. *Kuroiwa-kawa-tombo.*

Loc. Loo-Choo (KUROIWA).

Genus Mnais SELYS.

Three species belonging to the present genus have been known to occur in Japan, *viz. Mnais strigata, Mnais pruinosa* and *Mnais costalis.* All of them were first described by SELYS although the first had been authorized by HAGEN; to SELYS, however, the femels[1] of the last two were utterly unknown. By comparing the wing color only, these three, if be males, are easily distinguishable each other, but whenever we intend to sparate them by the females only, then we always find much perplexity thereon. They have, in the females, the wings of similar color, so they have a similar appearance to the males of *Mnais strigata* except the color of pterostigma. The three species live always in the same places, at least *M. strigata M. constalis,* in my observation, mingling each other along streams, consequently whenever the one is found the other can whithout exception be met with. I have occasionally caught the couples of both species in copulation, but the attempt to distinguish them by females only was in vain. After much consideration I wish now to combine them into one species recognizing the polymorphic nature in males

1) They are preserved in the college-collection in a large lot.

and to characterize them as follows.

8. **Mnais strigata** Hagen.

Mnais strigata Selys, Synop. Calop. p. 20 (1853).
Mnais pruinosa (male) Selys, Synop. Calop. p. 20 (1853).
Mnais costalis (male) Selys, Synop. Calop. add. II. p. 7 (1869).
Mnais pruinosa race costalis, Selys, Ann. Soc. Ent. Belg. XXVII. p. 129 (1883).

Length of the abdomen	♂ 40-45mm.	♀ 35-40mm.
Length of the hind wing	♂ 35-38mm.	♀ 35-38mm.
Length of the pterostigma	♂ 1.8-2mm.	♀ 1.5-2mm.

Male. Polymorphic in wing color. Body metallic green or greenish blue, dencely pruinosed in adult specimens, exept latenal sides of the thorax. The both sides of the labrum, a patch on the first joint of antenna, a small part on coxa and two streaks on the metepimeron dull yellow. Legs black. Upper anal appendages also black, blunt tipped, curved inwards with seven or eight spines of indefinite size along their outer margins. Wings vary according to forms as I am going to mention below, pteratigma long, invariably red in color.

α. typica (Hagen) Oguma. (Pl. 1. fig. 3).

Wings hyaline, often faintly suffused with pale yellow, nervures dark brown. I take this species as the typical form, not only by its simplest color like females, but also being priorly described.

β. costalis Selys. (Pl. 1. fig. 1-2).

Wings hyaline, distal three fourths bright saffron with an opaque part of brick color along the costa, the nervures dark brown, but those imbedded in the colored part likewise saffron. In the most of specimens the opaque part not extended to the pterostigma distally and to M_2, at most, posteriorly, but I have a single specimen in which the opaque part greatly elongated—reaching up to pterostigma in one direction, while surpassing A_1 in other

direction. This aberrant specimen was collected at Nayoro (Hokkaido) by Mr. KOMURA.

γ. pruinosa SELYS.

Wings hyaline, slightly tinged with yellow in the half way to nodus, the distal part from it of chestnut color, being paler towards the tips, at the costa and center of cells. Nervures dark brown, these in the dark colored region paler.

Of these three forms the last, as far as I am aware, is confined in distribution to Kiushiu, while the other two are very common in any part of Japan proper.

Female. Just like the *α*-form of male, only the body somewhat bronzy colored, pterostigma white. No distinct forms are represented corresponding to the three forms of male.

Nom. Jap. *Yanagi-tombo* (*α*-form).
Kawa-tombo (*β*-form).
Chairo-kawa-tombo (*γ*-form).
Loc. Hokkaido, Honshiu, Shikoku, Kiushiu.

9. **Mnais tenuis** OGUMA, sp. nov.

(Textfig. 1.)

Length of the abdomen ♂ 45-46mm. ♀ 40 42mm.
Length of the hind wing ♂ 35-38mm. ♀ 36-37mm.
Length of the pterostigma ♂ 1.2-1.5mm. ♀ 1mm.

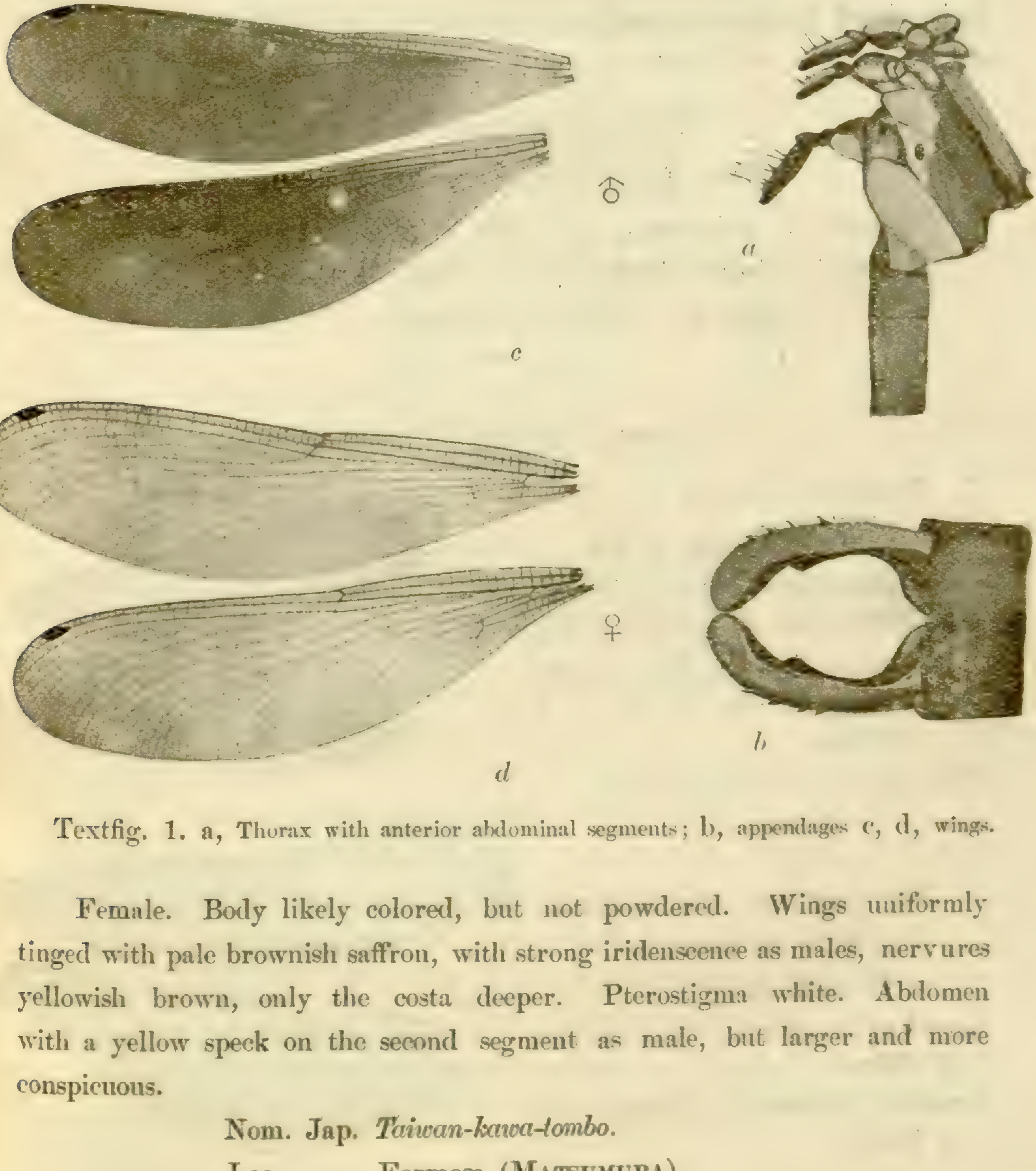
Male. Body: metallic green, densely powdered with white on the vertex, frontal part of the thorax including scapulae, basal parts of legs and the first three segments as well as the last four segments of abdomen.[1]

Thorax: The part below the second stigma and the whole metepimeron entirely pale straw yellow. Wings bright brownish saffron, only paler towards the quadrangle, nervures deeper in color, but the costa blackish;

1) In this point, this species resembles to *Mnais andersoni* MCLACHLAN.

pterostigma moderately long, more than twice as long as the breadth, the inner side stronly oblique, red, and followed by one row of cells. The whole surface of the wing with an intensive reflection of pearly violet. Legs black.

Abdomen: slender, a faint yellow speck on the anterior end of the second segment laterally.



Textfig. 1. a, Thorax with anterior abdominal segments; b, appendages c, d, wings.

Female. Body likely colored, but not powdered. Wings uniformly tinged with pale brownish saffron, with strong iridenscence as males, nervures yellowish brown, only the costa deeper. Pterostigma white. Abdomen with a yellow speck on the second segment as male, but larger and more conspicuous.

Nom. Jap. *Taiwan-kawa-tombo.*

Loc. Formosa (MATSUMURA).

This splendid and delicate species of *Mnais* was collected in Formosa by Prof. MATSUMURA in four male and two female specimens. The fact that the poststigmatic cells are arranged in one row indicates some relations to the continental species—*M. andersoni* and *M. earshawi*, but on the other hand the long stigma of this species shows the near relation to the insular species as *M. strigata*. As being mentioned above, this species is sharply distinguished from other Japanese *Mnais* by having entirely yellow epimeron and by the color of the wings, especially by their strong iridescent nature.

Genus Nevrobasis LINNEUS.

10. Nevrobasis chinensis LINNEUS.

Libellula chinensis SINN., Lyst. Nat. I. p. 545 (1758).

Nevrobasis chinensis SELYS, Synop. Calop. p. 18 (1883).

Nom. Jap. *Atoguro-kawa-tombo.*

Loc. Loo-Choo (doutful).

Genus Euphaea MCLACHLAN.

11. Euphaea formosa HAGEN.

(Textfig. 2, b)

Euphaea formosa SELYS, Synop. Calop. add. III. p. 16 (1869).

Euphaea formosa Ris, Suppl. Entom. I. p. 52, figs. 4, 5 (1912).

Nom. Jap. *Nakahaguro-tombo.*

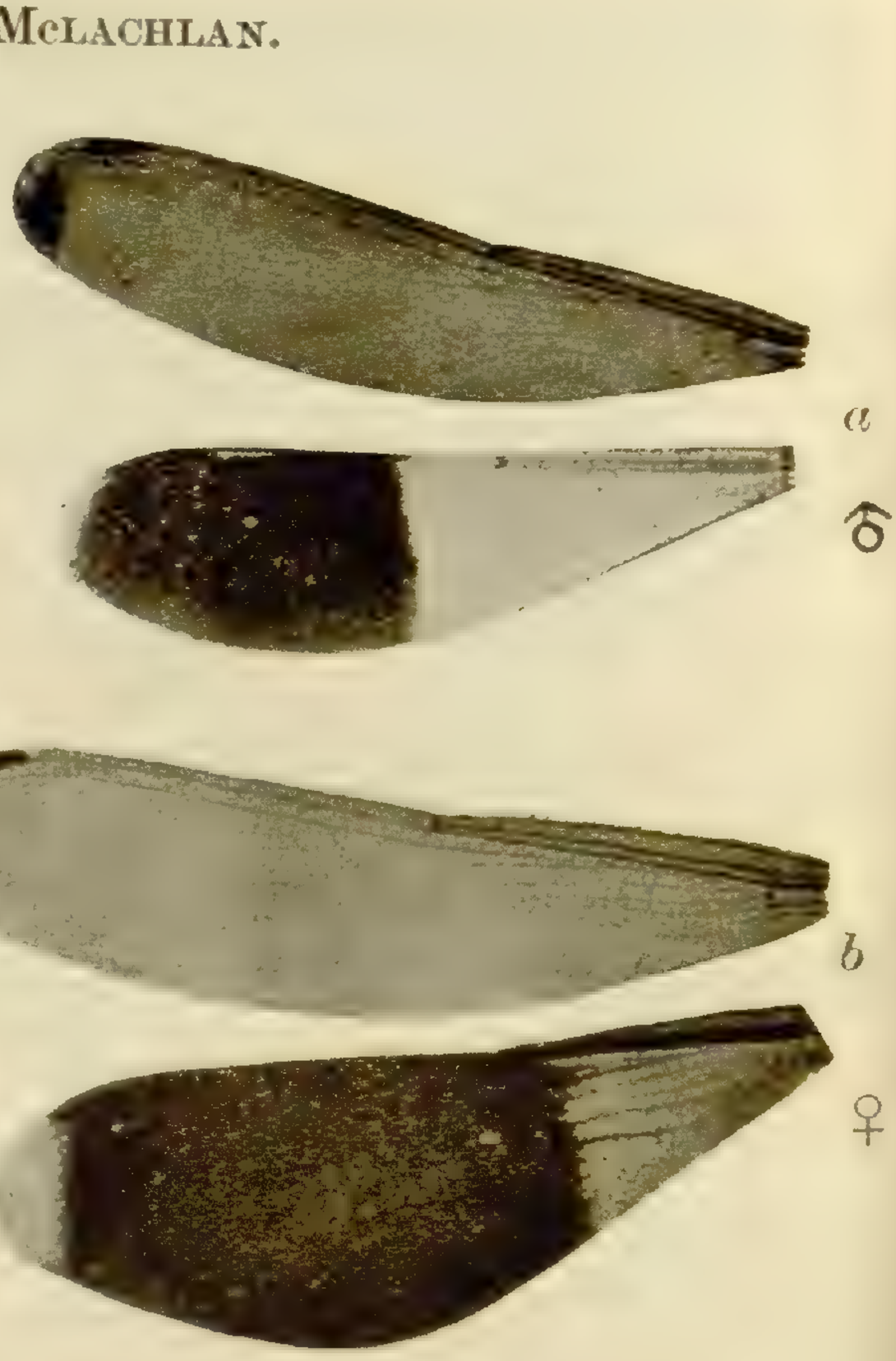
Loc. Formosa.

12. Eupnaea yayeyamana MATSUMURA sp. nov.

(Textfig. 2, a.)

Length of the abdomen ♂ 31-32mm.
♀ 26mm.

Length of the fore wing ♂ 27-29mm.
♀ 26mm.



Textfig. 2.

Length of the hind wing ♂ 24-26mm. ♀ 25mm.

Length of the pterostigma ♂ ♀ 2.5mm.

Form and color like the preceding species, but differs from it in the following points.

1. Size much smaller in both sexes.

2. Male. Hind wing not so strongly dilated, the opaque band much more reduced—its proximal end lies far distally from nodus.

3. Male. Fore wing with a black speck at the apex.

4. Male. The terminal four segments of the abdomen black.

5. Female. Color of the hind wing paler.

6. Female. The yellow dots on the last two abdominal segments smaller and inconspicuous.

Nom. Jap. *Ko-nakahaguro-tombo.*

Loc. Loo-Choo.

Genus Bayadera Selys.

13. Bayadera hyalina Selys.

Bayadera hyalina Selys, Synop. Calop. add. IV. p. 27 (1879).

" " Ris, Suppl. Ent. I. p. 50. Textfig. 3. T. IV. fig. 1 (1912).

Nom. Jap. *Hime-kawa-tombo.*

Loc. Formosa (Sauter, Matsumura).

Genus Rhynocypha Rambur.

14. Rhynocyyha 14-maculata Oguma. sp. nov.

(Textfig. 3.)

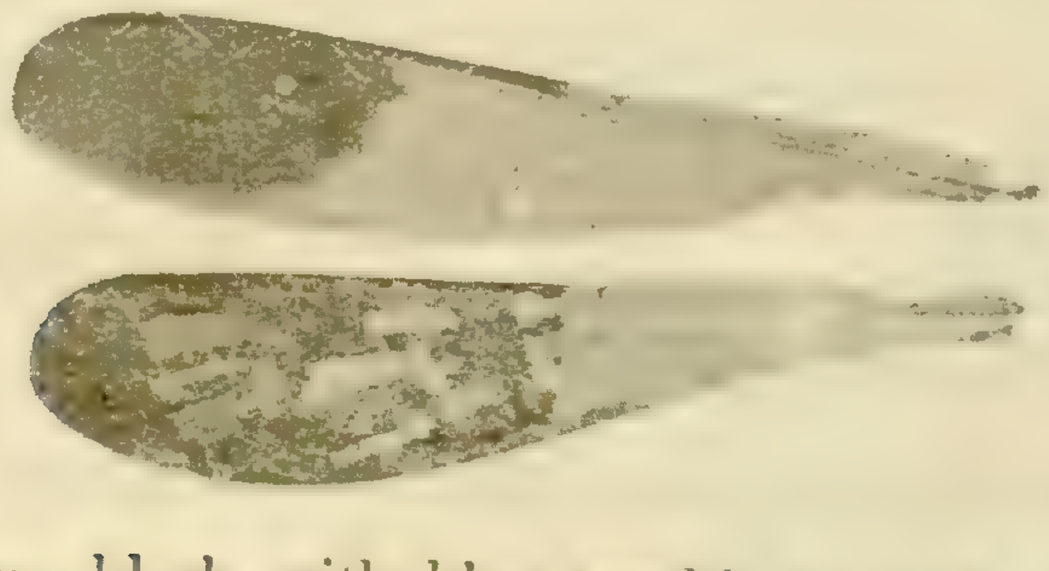
Length of the abdomen ♂ 19mm.

Length of the hind wing ♂ 23mm.

Length of the pterostigma ♂ 2.5mm.

Male. Head: black, two small spots near the eyes and a long marking along the posterior margin yellowish white. Labium whitish, scarcely black tipped.

Thorax: black, with blue spots and stripes arranged as follows:— a spot just below the scapula, an elongated spot on the upper part of the first coxa, three broad bands on the side, of which the first on the mesepimeron, the recond on the metepisternum connected with the first above the coxae, the third on the metepimeron occuping nearly the whole area of it. Metasternum black with two pairs of yellowish dots. Legs black, the inner sides white. Wings moderately hroad; fore wings hyaline in the proximal two thirds of the whole length, and the apical part from it black, this opaque part being prolonged proximally along the costa to the second antenodal, and a narrow space at the hind margin paler as we see frequently in many of other species of this genus. Hind wings hyaline in nearly half way to apex, the distal half black with three rows of vitreous markings; of which the first series represented by merely one and prolonged into the hyaline portion; the second series consists of three markings, the middle of which being the largest and including two rows of cells, while the other two contain merely one row of cells; the third series composed of also three, the middle one contains one row of cells, and the other two contain three rows of cells in each, and the uppermost being the longest; a narrow portion, moreover, at the hind margin pale and iridescent. Pterostigma black.



Textfig. 3.

Abdomen: black, with blue markings on the sides of the segments 1-8, those on the first segment being large and triangular in form, those on the second segment long, linear form, and those on the third to eighth smaller, roundish in form. Upper anal appendages longer than the 9th segment, the lower short.

Female. Unknown.

Nom. Jap. *Sukiba-hanadaka-tombo.*

Loc. Formosa (MATSUMURA).

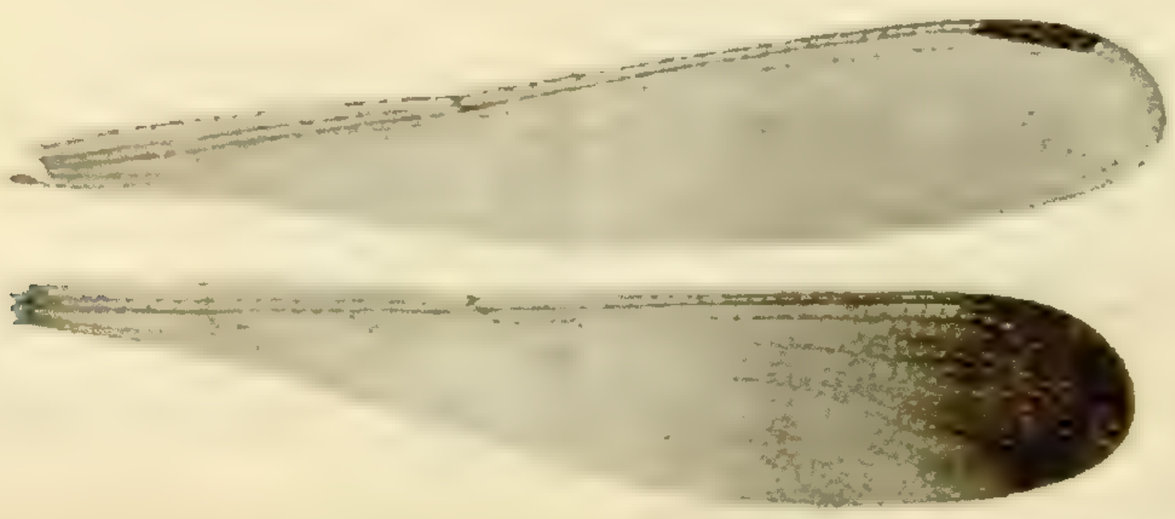
15. **Rhynocypha ogasawarensis** MATSUMURA. sp. nov.

(Textfig. 4)

Length of the abdomen	♂ 20-21.5mm.	♀ 18-19mm.
Length of the hind wing	♂ 24-26mm.	♀ 25mm.
Length of the pterostigma	♂ 2.5mm-3mm.	♀ 2.4mm.

Head: glossy black, the anterior side of the basal joint of the antenna, a large spot below it and the sides of the labrum straw yellow; on the vertex with a pair of oblong yellowish spots between the ocelli and the eyes, and another pair of small spots in similar color very close to eyes.

Male. Thorax: black, with two narrow yellowish streaks at the sides, stretching along the first and the third lateral sutures, a small similarly colored spot on the upper part of the mesepisternum and metepimeron. Wings narrow and long; fore wings hyaline, suffused with dark yellow, the very apical part scarcely colored; the hind wings also hyaline; but being somewhat deeper in color, the apical one fifth blackish; pterostigma brown.



Textfig. 4.

Abdomen: rather depressed, dorsal surface dark red, while the ventral surface and the sutures of segments black. Upper anal appendages slender, nearly as long as the 9th segment, curved inwardly, black in color; the lower nearly the half the length of the upper and also black.

Female. Thorax: similarly colored with the male, but with more a pair of thready red stripes on the front of the mesothorax and a large speck on the metepimeron at sides. Wings hyaline, much deeply colored than the male, wanting the black part at all.

Abdomen: not depressed as in the male, the dorsal surface reddish brown, the ventral surface, the sutures of the segments and long spots near the

posterior margin of each segment black. These black spots occasionally so enlarged as to take place of the red portion. Segments 9 & 10 almost black, anal appendages twice as long as the tenth segment, sharply pointed and brownish in color.

Nom. Jap. *Hanadaka-tombo.*

Loc. Bonin Islands or Ogasawarajima (MATSUMURA).

Genus Micromerus RAMRUR.

16. Micromerus lineatus BURMEISTER.

Micromerus lineatus RAMB., Ins. Nevr. p. 238 (1842).
" " SELYS, Synop. Calop. p. 65 (1853).
" " WILLIAMSON, Proc. U. S. Nat Mus. XXVIII. p. 171. figs. 5 & 6 (1904).

Nom. Jap. *Hime-hanadaka-tombo.*

Loc. Formosa (MATSUMURA).

Genus Palaeophlebia SELYS.

17. Palaeophlebia suprestes SELYS.

Palaeophlebia suprestes SELYS, C. R. Soc. Ent. Belg. XXXIII. T. 2 (1889).

Nom. Jap. *Mukashi-tombo.*

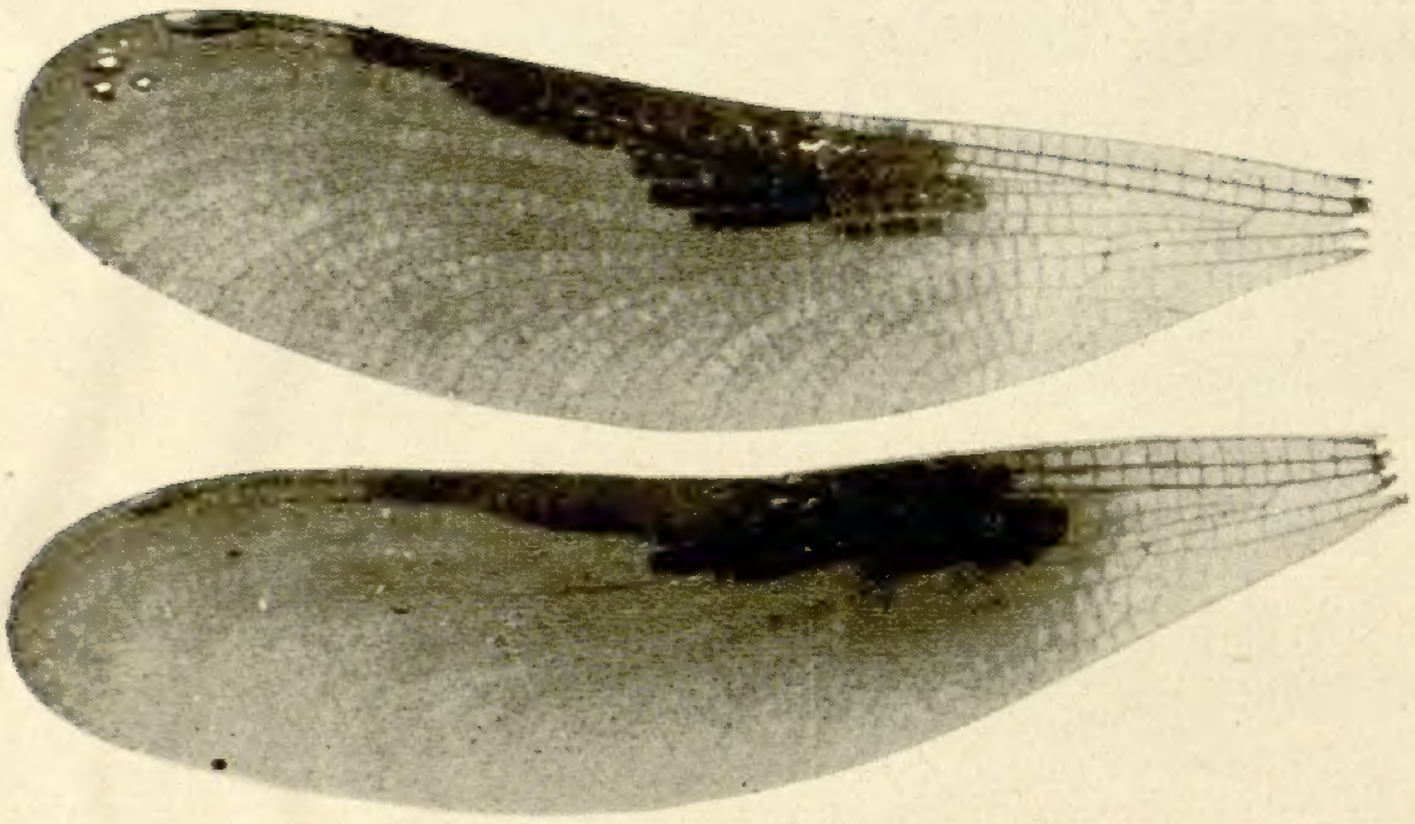
Loc. Hokkaido (Sapporo, MATSUMURA), Honshiu (Kyoto, SUZUKI), Kiushiu (Hikosan, TAKACHIHO).

It is very interesting fact to know that this species is widely distributed in Japan, though very rare an any part of these localities.

March, 1913.

Explanation of the plate X.

Fig. 1. Left wings of *Mnais strigata costalis* (♂).
Fig. 2. An aberrant form of the same (♂).
Fig. 3. Right wings of the *Mnais strigata typica* (♂).
Fig. 4. Right wings of *Mnais strigata* (♀).



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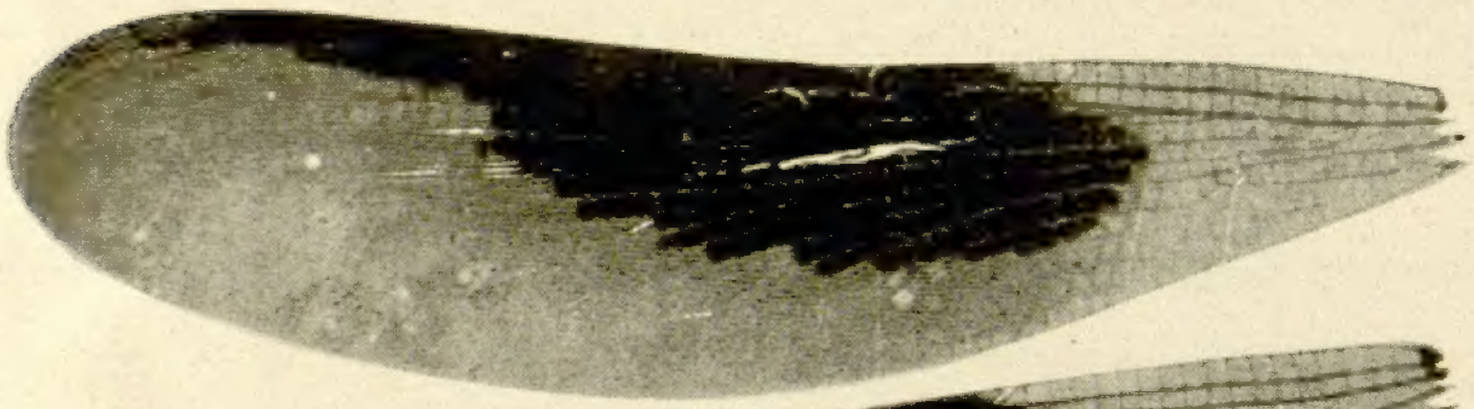

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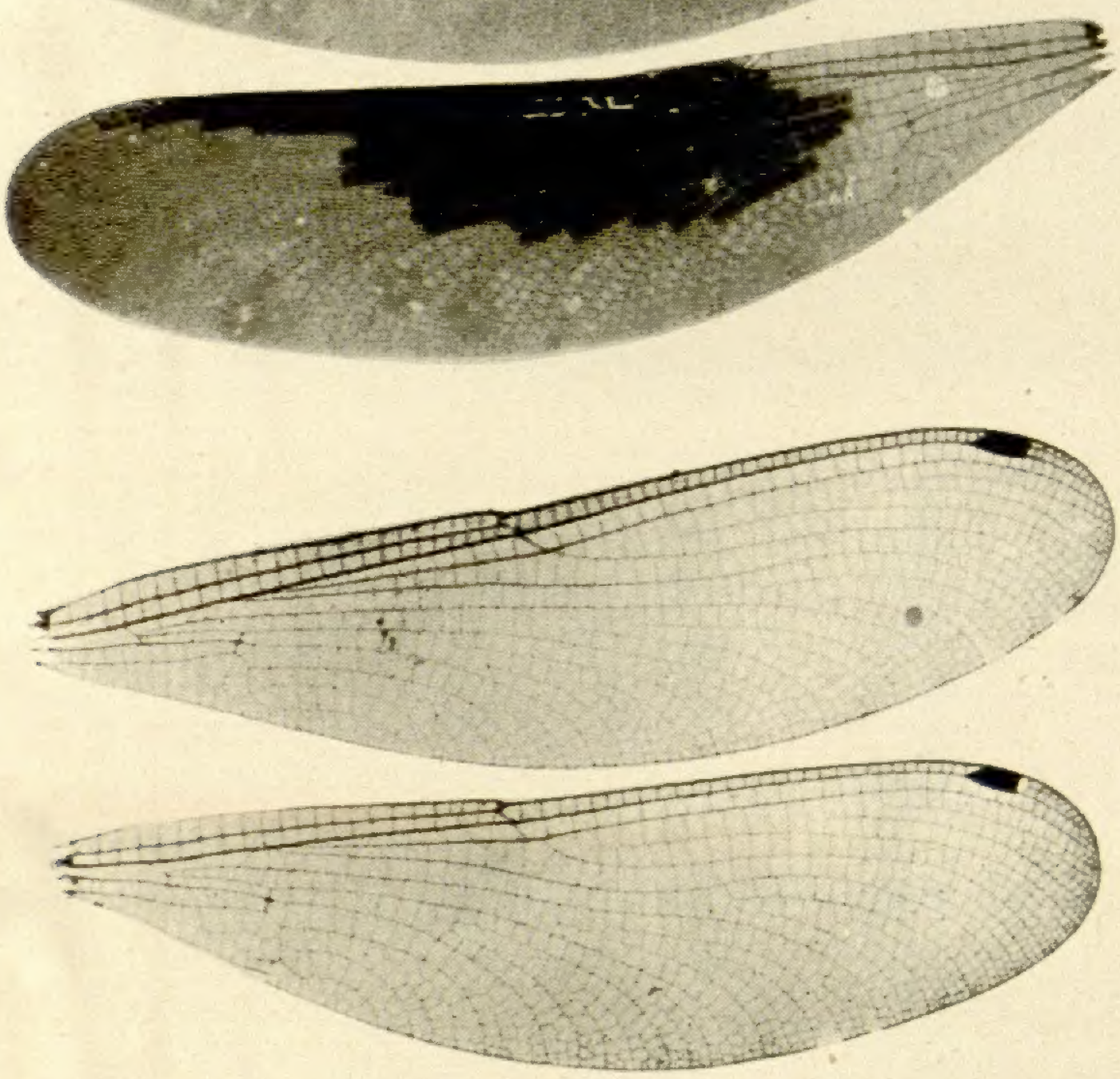

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CONTENTS OF VOLUME V.

I. **Untersuchungen über die Schädel der Chosen-, Tsushima- und Tottori-Rinder.** Von K. Iguchi. 1

II. 1. **Studies on Flax Retting.** By T. Tadokoro. 31

2. **Ueber die Enzymatischen Wirkungen der Frischen Nahrungs- und Genussmittel.** Von T. Tadokoro. 57

III. **On Fungi Parasitic on Scale-Insects Found in Formosa.** By K. Miyabe and K. Sawada. 73

IV. **A Study of Mendelian Factors in the Silkworm, Bombyx mori.** By Y. Tanaka. 91

V. **Gametic Coupling and Repulsion in the Silkworm, Bombyx mori.** By Y. Tanaka. 115

VI. **Japanese Dragonflies of the Family Calopterygidae with the Descriptions of Three New Species and One New Subspecies** By K. Oguma. 149